

## CLAIMS

1. A computer method for image analysis, comprising the steps of:  
receiving an image;  
transforming the image into a feature space;  
selecting at least one ROI at a pixel level of processing;  
extracting features from the ROI at a pixel level of processing;  
selecting at least one non-ROI at a pixel level of processing;  
extracting features from the non-ROI at a pixel level of processing;  
ranking the extracted features based on feature performance for successful detection of a selected ROI at a pixel level of processing;  
recording the ranked extracted features;  
selecting a classification algorithm;  
running the classification algorithm to classify the image into regions of interest at a pixel level of processing; and  
recording the ROIs based on pixel processing.
2. The computer method of claim 1 wherein the step of selecting at least one ROI includes selecting one or more pixels from the image; and wherein the step of selecting at least one non-ROI includes selecting one or more pixels from the image.
3. The computer method of claim 1 further including the step of transmitting the recorded ROIs at a pixel level of processing for laser capture microdissection.
4. The computer method of claim 1 further including the step of selecting a second level of processing.
5. The computer method of claim 4 wherein the second level of processing is subimage processing.

6. The computer method of claim 5 further including the steps of:
  - selecting at least one polygonal ROI at a subimage level of processing;
  - extracting features from the polygonal ROI at a subimage level of processing;
  - selecting at least one polygonal non-ROI at a subimage level of processing;
  - extracting features from the non-ROI at a subimage level of processing;
  - ranking the extracted features based on feature performance for successful detection of a selected ROI;
  - recording the ranked features based on subimage processing;
  - selecting a classification algorithm;
  - running the classification algorithm to classify the image into regions of interest based on subimage processing; and
  - recording the regions of interest based on subimage processing.
7. The computer method of claim 6 further including the step of transmitting the recorded regions of interest based on subimage processing for laser capture microdissection.
8. The computer method of claim 4 wherein the second level of processing is object processing.
9. The computer method of claim 8 further including the steps of:
  - selecting at least one polygonal ROI at an object level of processing;
10. The computer method of claim 9 further including the steps of:
  - recording the at least one polygonal ROI at an object level of processing;
  - transmitting the at least one polygonal region of interest based on object processing for laser capture microdissection.
11. The computer method of claim 9 further including the steps of:

extracting features from the ROI at an object level of processing;  
selecting at least one polygonal non-ROI at an object level of processing;  
extracting features from the non-ROI at an object level of processing;  
ranking the extracted features based on feature performance for successful  
detection of a selected ROI;  
recording the ranked features based on object processing;  
selecting a classification algorithm;  
running the classification algorithm to classify the image into regions of  
interest based on object processing;  
recording the regions of interest based on object processing.

12. The computer method of claim 11 further including the step of  
transmitting the regions of interest based on object processing for laser capture  
microdissection.

13. The computer method of claim 4 further including the step of selecting a  
third level of processing.

14. The computer method of claim 13 wherein the third level of processing is  
object level processing.

15. The computer method of claim 14 further including the steps of:  
selecting at least one polygonal ROI at an object level of processing.

16. The computer method of claim 15 further including the steps of:  
recording the at least one polygonal ROI at an object level of processing;  
transmitting the at least one polygonal region of interest based on object  
processing for laser capture microdissection.

17. The computer method of claim 15 further including the steps of:  
extracting features from the ROI at an object level of processing;

selecting at least one polygonal non-ROI at an object level of processing;  
extracting features from the non-ROI at the object level of processing;  
ranking the extracted features based on feature performance for successful  
detection of a selected ROI;  
recording the ranked extracted features based on object processing;  
selecting a classification algorithm;  
running the classification algorithm to classify the image into regions of  
interest based on object processing; and  
recording the regions of interest based on object processing.

18. The computer method of claim 17 further including the step of  
transmitting the regions of interest based on object processing for laser capture  
microdissection.

19. A computer method for image analysis, comprising the steps of:  
receiving a first image;  
transforming the first image into a feature space;  
selecting a level of abstraction;  
selecting a database containing parameters based on the selected level of  
abstraction;  
classifying the first image into regions of interest employing the  
parameters from the database based on the selected level of abstraction;  
updating the parameters of the database for the level of abstraction with  
data from the first image;  
receiving a second image;  
transforming the second image into a feature space;  
classifying the second image into regions of interest employing the  
updated parameters from the database based on the selected level of abstraction;  
updating the parameters of the database with data from the second image.

20. The computer method for image analysis of claim 19 wherein the step of selecting a level of abstraction includes selecting pixel processing.
21. The computer method for image analysis of claim 20 further including the step of transmitting the regions of interest obtained from pixel processing for laser capture microdissection.
22. The computer method for image analysis of claim 19 wherein the step of selecting a level of abstraction includes selecting subimage processing.
23. The computer method for image analysis of claim 22 wherein the step of classifying the first image includes classifying the first image into regions of interest employing parameters from the database for pixel processing and classifying the first image into regions of interest employing parameters from the database for subimage processing; and wherein the step of classifying the second image includes classifying the second image into regions of interest employing parameters from the database for pixel processing and classifying the second image into regions of interest employing parameters from the database for subimage processing.
24. The computer method for image analysis of claim 23 further including the step of transmitting the regions of interest obtained from subimage processing for laser capture microdissection.
25. The computer method for image analysis of claim 19 wherein the step of selecting a level of abstraction includes selecting object processing.
26. The computer method for image analysis of claim 25 wherein the step of classifying the first image includes classifying the first image into regions of interest employing parameters from the database for pixel processing and classifying the first image into regions of interest employing parameters from the

database for subimage processing and classifying the first image into regions of interest employing parameters from the database for object processing; and wherein the step of classifying the second image includes classifying the second image into regions of interest employing parameters from the database for pixel processing and classifying the second image into regions of interest employing parameters from the database for subimage processing and classifying the second image into regions of interest employing parameters from the database for object processing.

27. The computer method for image analysis of claim 26 further including the step of transmitting the regions of interest obtained from object processing for laser capture microdissection.

28. The computer method for image analysis of claim 25 wherein the step of classifying the first image includes classifying the first image into regions of interest employing parameters from the database for pixel processing and classifying the first image into regions of interest employing parameters from the database for object processing; and wherein the step of classifying the second image includes classifying the second image into regions of interest employing parameters from the database for pixel processing and classifying the second image into regions of interest employing parameters from the database for object processing.

29. The computer method for image analysis of claim 28 further including the step of transmitting the regions of interest obtained from object processing for laser capture microdissection